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QUESTION PAPER  
SERIES CODE

A

Centre of Examination : \_\_\_\_\_

Roll No. : \_\_\_\_\_

Name of Candidate : \_\_\_\_\_

**S A U**

**Entrance Test for Ph.D. (Economics)**

[ 2013 ]

Time : 3 hours

Maximum Marks : 100

**INSTRUCTIONS FOR CANDIDATES**

*Candidates must carefully read the following instructions before attempting the Question Paper :*

- (i) Write your Name and Roll Number in the space provided for the purpose on the top of this Question Paper and in the Answer Book.
- (ii) This Question Paper has Four Parts : Part—A, Part—B, Part—C and Part—D.
- (iii) Part—A has six questions out of which, only **three** should be answered.
- (iv) Part—B has four questions out of which, only **two** should be answered.
- (v) Part—C has four questions out of which, only **two** should be answered.
- (vi) Part—D has six questions out of which, only **three** should be answered.
- (vii) All the **four** Parts have subjective-type questions. Each question carries **10** marks.
- (viii) Calculators and Log Tables may be used.
- (ix) **Return the Question Paper and the Answer Book** to the Invigilator at the end of the Entrance Test.

**PART—A**

Answer *any three* questions

1. Suppose Dr. A hires a teaching assistant (TA) Mr. B, to teach Advanced Microeconomic Theory. If the students fail the course, then Dr. A loses Rs 20,000; if the students pass the course Dr. A receives Rs 1,00,000. Mr. B can choose to either 'shirk' (i.e., does not put in the required effort level; effort level,  $e = 0$ ) or 'work' (i.e., effort level,  $e = 1$ ). Dr. A cannot observe whether his teaching assistant shirks or works, only whether students pass or fail. If Mr. B shirks, students fail for sure; if he works, then the students' failure and success are equiprobable. Working rather than shirking involves a disutility of Rs 10,000 for Mr. B.

- (a) Do you think that TA will work or will he shirk?

Now suppose Dr. A offers Mr. B a fixed wage of Rs 20,000 (regardless of whether students pass or fail the course).

- (b) Compare the teaching assistant's payoffs for the two effort levels and show what his choice of effort will be.

Suppose instead, that Dr. A offers a pay scheme where his assistant receives nothing if students fail and Rs  $x$  if students pass. Note that Mr. B could reject the offer and earn Rs 10,000 with certainty by teaching another course.

- (c) What do you think is the lowest  $x$  that Dr. A can pay Mr. B such that he will accept the job and work rather than shirk it?

2. Suppose there is a market for used cars. Some of them could be in a bad condition, while some of them could be in a good working condition. The seller knows the quality of the car while the buyer does not. The probability that a buyer is looking at a bad car is 0.2. Let  $S_b = 1000$  and  $S_g = 2000$ , where  $S_b$  and  $S_g$  are the reservation price of the sellers of bad cars and good cars respectively. Likewise  $V_b = 1200$  and  $V_g = 2400$ , where  $V_b$  and  $V_g$  are the maximum price buyers are willing to pay for bad cars and good cars respectively. In the equilibrium which cars do you expect to be sold in the market? If now the probability that a buyer is looking at a bad car becomes 0.5, which cars do you expect to be sold in the market in the equilibrium?

3. A monopolist has a cost function  $c(q) = q$ . It faces the following demand curve :

$$D(p) = \begin{cases} 0 & , \text{ if } p > 20 \\ 100/p & , \text{ if } p \leq 20 \end{cases}$$

- (a) What is the profit maximizing choice of price and output for the monopolist?
- (b) If the government could set a price ceiling on this monopolist in order to force it to act as a competitor (as in perfect competition), what price should the government set?
- (c) What output would the monopolist produce if it is forced to behave as a competitor (as in perfect competition)?

4. There are three major markets in an economy—labour, capital and product. The economic analysis of most government policies requires a general equilibrium approach, since the policies affect all of these markets in the economy, even though they often appear to be directed to only one of these markets. Like a number of European economies, India has now adopted the VAT (Value-Added Tax), a type of national sales tax. In this problem, we analyze the general equilibrium effects of VAT, assuming for simplicity, that it is a per unit tax on all goods and services bought and sold. The analysis is easily adapted to analyze the case when the tax is taken as a percentage of the price of the good, as is the case with VAT.

- (a) Use a three-market and one-homogeneous 'good' in each market model to analyze diagrammatically the effects of a VAT, taken as a per unit tax on all goods and services.
- (b) Make an appropriate assumption to find a determinate solution to the equilibrium price and quantity in all markets.
- (c) Who pays the VAT?
- (d) How will your analysis be modified if you consider the tax as a percentage tax on all goods and services?

5. (a) Define a Giffen good and an inferior good. Show that a Giffen good must be an inferior good.

- (b) Consider a consumer who consumes three goods. The following bundles of goods ( $x^i$ ) were observed to be purchased at the corresponding prices ( $p^i$ ). The corresponding income levels ( $m^i$ ) are also shown in the data :

$$\begin{array}{lll} x^0 = (2, 2, 2) & p^0 = (2, 2, 2) & m^0 = 12 \\ x^1 = (3, 1, 2) & p^1 = (1, 3, 2) & m^1 = 10 \\ x^2 = (1, 1, \frac{3}{2}) & p^2 = (2, \frac{3}{2}, 5) & m^2 = 11 \end{array}$$

Examine if the data satisfies either the weak or the strong axiom of revealed preference.

6. Consider a two-consumer, two-good, pure exchange economy. The two consumers 1 and 2 have the following utility functions :

$$u_i(x_i, y_i) = x_i + y_i, \quad i = 1, 2$$

The consumers' initial endowments are  $e_1 = (0, 1)$  and  $e_2 = (1, 0)$ .

- (a) Draw the Edgeworth box for this exchange economy, indicating some of the indifference curves (or, indifference sets) for the two goods of the consumers.
- (b) Show the Pareto set for this economy.
- (c) What is the contract curve of this economy? Indicate it in the diagram.

**PART—B**

Answer *any two* questions

7. According to an increasingly prominent view, poorer countries are teeming with entrepreneurs, many times more than what you find in richer countries. How do you explain this?
  
8. Argue whether structural characteristics of the US economy, e.g., inequality, had anything to do with the current economic crisis.
  
9. While most of the small farms in South Asia are unremunerative, there is intense opposition to land acquisition for industrial projects, even when land is acquired at prices greater than market prices. How do you explain this?
  
10. Discuss the reasons behind the persistence—often expansion—of the informal economies in South Asia in spite of decent economic growth in the last decade.

**PART—C**

Answer *any two* questions

11. A researcher interested in knowing the determining factors of wages regressed it on the level of education. Suspecting that the experience level also matters in wage determination, he decided to test whether experience level is an omitted variable in his model. To conduct the test, he simply regressed the residuals from the above regression on the experience level. The test indicated that the coefficient of experience level was not significantly different from zero. The researcher thus rejected his suspicion and concluded that the experience level is irrelevant for wages. Comment on the validity of the results obtained by the researcher.
12. Although Durbin-Watson test is very popular for detecting autocorrelation, it has several limitations. Indicate these limitations and suggest corresponding alternatives.
13. Koyck transformation, partial adjustment and adaptive expectation models are conceptually different. Comment.
14. What are the assumptions under which Gauss-Markov theorem is valid? What happens when these assumptions are violated?

**PART—D**

Answer any **three** questions

- 15.** Consider a decentralized, competitive market economy in continuous time, consisting of a single dynasty of identical, representative and infinitely-lived households. The households maximize intertemporal utility

$$\int_0^{\infty} e^{-\rho t} U[c(t)] dt, \quad U'[c(t)] > 0, \quad U''[c(t)] < 0, \quad \lim_{c(t) \rightarrow 0} U'[c(t)] = +\infty, \quad \lim_{c(t) \rightarrow +\infty} U'[c(t)] = 0$$

where  $c$  is the per capita consumption and  $\rho$  the rate of time preference. There is only one asset in the economy, represented in per capita terms by  $k$ . Households derive their income from labour income and income from assets. Producers have a technology represented by a production function

$$y = f[k(t)], \quad f'[k(t)] > 0, \quad f''[k(t)] < 0, \quad \lim_{k(t) \rightarrow 0} f'[k(t)] = +\infty, \quad \lim_{k(t) \rightarrow +\infty} f'[k(t)] = 0,$$

where  $y$  and  $k$  are the per capita output and per capita stock of capital respectively. The growth rate of workforce as well as the rate of depreciation of the capital stock is constant. Show that the saddle path is the unique stable path for per capita stock of capital and the per capita consumption in this setup.

- 16.** Consider a model of overlapping generations where each household lives for two periods. In the first period, it inelastically supplies one unit of labour, while in the second period it lives off its wealth or savings. Savings can be held only in the form of one asset—the capital stock. The intertemporal utility function for the households is given by the logarithmic Cobb-Douglas function. Production is conducted by firms using a Cobb-Douglas production function without technological progress. The rate of growth in birth as well as the rate of depreciation of capital stock is constant. In this setup, compare the effect of introducing a fully funded pension system (where the government collects premium from the young and invests it in the financial market) with a Pay-As-You-Go pension system (where the government collects premium from the young and distributes it immediately to the old). Show that if initially there is an over-accumulation of capital (i.e., the steady state per capita stock of capital exceeds the golden rule), introduction of Pay-As-You-Go system would lead to a Pareto improvement.

- 17.** Consider a worker searching for a job. Wages ( $w$ ) have a probability density function across jobs  $f(w)$  that is known to the worker. Let  $F(w)$  be the associated cumulative distribution function. Each time the worker samples a job from the distribution, he or she incurs a cost of  $C$ , where  $0 < C < E[w]$ . When the worker samples a job, he or she can either accept it (in which case the process ends) or sample another job. The worker maximizes the expected value of  $w - nC$ , where  $w$  is the wage paid in the job the worker eventually accepts, and  $n$  is the number of jobs the worker ends up sampling. Let  $V = E[w - n'C]$  for a worker who has just rejected a job, where  $n'$  is the number of jobs the worker will sample from that point on.

- (a) Show that worker in such a situation will follow a reservation wage strategy.  
 (b) Explain why  $V$  satisfies

$$V = F(V)V + \int_{w=V}^{\infty} wf(w)dw - C$$

- (c) Will a searcher ever want to accept a job that he or she has previously rejected?

18. Show how, in the absence of any wage/price rigidity, the economy would settle down at the nonaccelerating inflation rate of unemployment (NAIRU) in the short run. Contrast this view with Keynes', who argued that there might not be any equilibrium in the absence of wage rigidity.
19. Harrodian knife-edge instability appears because 'market seems to give perverse signal to the investor'. Comment.
20. In a macroeconomic North-South growth framework, where the developed countries in the north import primary products from the underdeveloped countries in the south, explain how declining terms of trade against primary products can act as a factor behind uneven development between the advanced and the underdeveloped economies.

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